

Ecological Niche Modeling: A Crash Course

Pam Soltis, Charlotte Germain-Aubrey, Blaine Marchant,
Clayton Visger, Lauren Gonzalez



Ecological Niche Modeling: A Crash Course

Other iDigBio Personnel:
Kevin Love, Molly Phillips, Gil Nelson



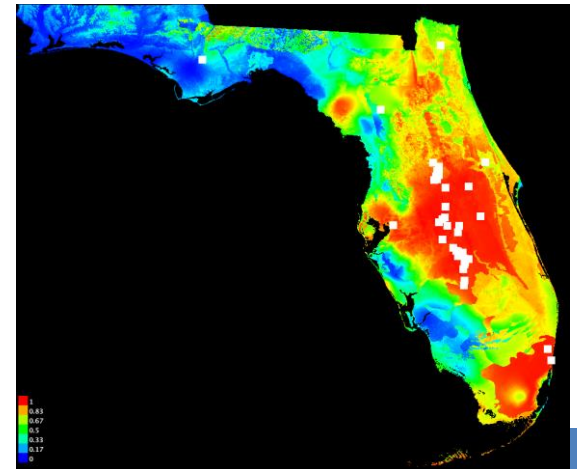
Ecological Niche Modeling (AKA Species Distribution Modeling): A Crash Course

Pam Soltis, Charlotte Germain-Aubrey, Blaine Marchant,
Clayton Visger, Lauren Gonzalez



Logistics

- Crash course
- Materials on wiki at iDigBio
- Stop us with questions
- Box lunches provided by iDigBio
- Come and go as you need...



Overview of Day's Activities

- 8:00 Introduction to the workshop & participants – Pam
- 8:20 Introduction to concepts of ENM – Charlotte
- 8:30 Examples of ENM – Charlotte, Blaine, and Clayton
- 9:00 Sources of locality data – iDigBio demo – Pam
- 9:30 Georeferencing concepts – Blaine
- 10:00 Break
- 10:15 Sources of climate data – Lauren
- 10:30 Intro to R and demo of running Maxent – Charlotte
- 12:00 Lunch - PROVIDED
- 1:00 Interpreting Maxent results - Clayton
- 1:30 Projecting results to different times and areas – Blaine
- 2:00 Special topics: making the most of your results – Clayton, Charlotte
- 3:00 Break
- 3:15 Work on data analysis – all
- 4:50 Summary – Pam
- 5:00 End

Using Museum Specimens in ENM

- Herbaria important sources of information on past and present species distributions
- Location information and environmental data
 - temperature, precipitation, soil
- Software to model the range of each species
- Project onto other areas or future climate conditions

Calhoun County



Label Data

- Scientific name – including authority
- Collector
- Location – state, county, specific site, GPS coordinates
- Date
- Associated species
- Notes



Label Data

- Scientific name – including authority
- Collector
- Location – state, county, specific site, GPS coordinates
- Date
- Associated species
- Notes

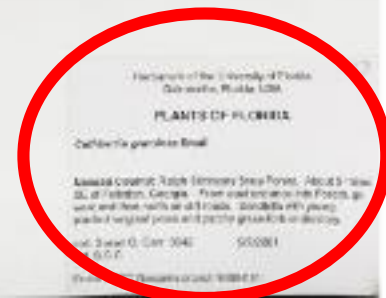


- United States: Florida: Nassau County. Ralph Simmons State Forest. About 5 miles SE of Folkston, Georgia. From east entrance into Forest, go west and then north on dirt roads. Sandhills with young planted longleaf pines and patchy grass-forb understory.

Callisia graminea
grassleaf roseling



Callisia graminea
Photo by Darryl Searcy



Herbarium of the University of Florida
Gainesville, Florida 32611

PLANTS OF FLORIDA

Callisia graminea Benth.

Nassau County, Ralph Simmons State Forest, About 5 miles SE of Folkston, Georgia. From east entrance into Forest, go west and then north on dirt roads. Sandhills with young planted longleaf pines and patchy grass-forb understory.

Det. David G. Carr 3041 5/20/81
U.S.C.P.

FLAS 231677

What's in a locality?

- A description of collection location. Written from specific to general, or general to specific, including a specific locality, offset(s) from a reference point, and administrative units such as county, state, and country.

Examples:

Locality example using distance and heading along a path:

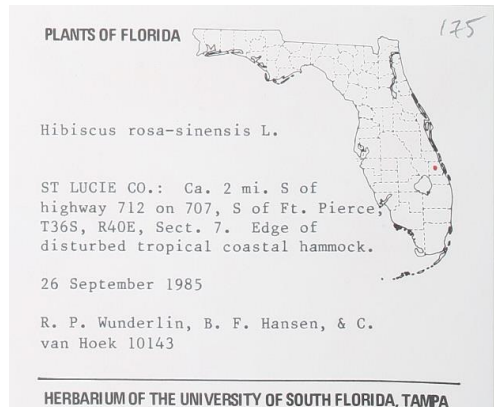
E shore of Bolinas Lagoon, 3.1 mi NW via Hwy. 1 from intersection of Hwy. 1 and Calle del Arroyo in Stinson Beach (town), Marin Co., Calif.

Locality example using two cardinal offset distances from a reference point:

ice field below Cerro El Plomo, 0.5 km S and 0.2 km W of summit, Region Metropolitana, Chile.

Why do good localities matter?

- Collecting data in the field sets the stage for good georeferencing procedures
- Contains useful information for other biologists
 - Future collections, conservation, ecology, taxonomy, niche modeling...



Where do we get locality data?

free and open access to biodiversity data
GLOBAL BIODIVERSITY INFORMATION FACILITY

383,027,468 indexed records
 9,962 datasets
 456 publishers

[Access data portal](#)

About iDigBio | Research

38,119,987 Specimen Records
 10,807,736 Media Records
 613 Recordsets

Making data and images of millions of biological specimens available on the web

[Search the Portal](#)

V5.0 (2015版)
中国数字植物标本馆
 Chinese Virture Herbarium (CVH)

CRIB projects

[The Atlas Of Living Australia](#)

[Information Systems](#)

*species*link

Consortium of Pacific Northwest Herbaria
 Providing access to specimen data and digital resources from herbaria throughout Pacific Northwest North America

Where do we get locality data?



free and open access to biodiversity data
GLOBAL BIODIVERSITY INFORMATION FACILITY

Search

383,027,468 indexed records
9,962 datasets
456 publishers

[Access data portal](#)

GBIF Science Symposium 2012 presentations and interviews




About iDigBio | Research

Google™ Custom:

38,119,987 Specimen Records
10,807,736 Media Records
613 Recordsets

Making data and images of millions of biological specimens available on the web

[Search the Portal](#)




V5.0 (2015版)
中国数字植物标本馆
Chinese Virture Herbarium (CVH)



The Atlas Of Living Australia

FEEDBACK



CRIB projects

Information Systems

speciesLink

Consortium of Pacific Northwest Herbaria
Providing access to specimen data and digital resources from herbaria throughout Pacific Northwest North America.





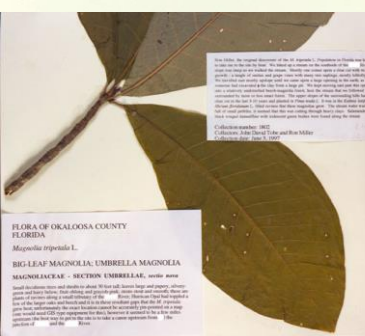
National Coordinating Center For Digitization of Biodiversity Collections

Ingest, serve, integrate data:

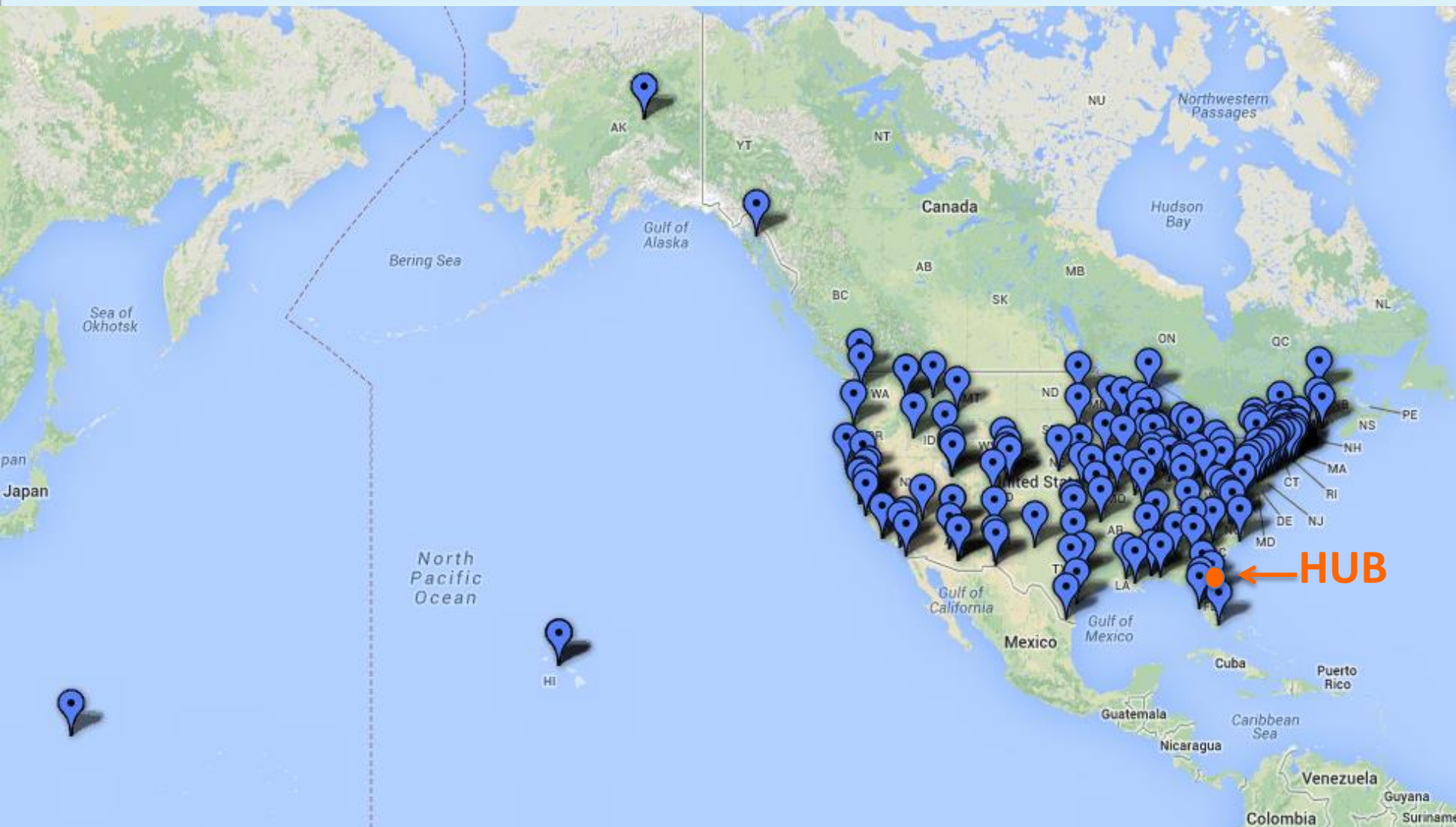
Localities

Dates

Images



NATIONAL HUB, THEMATIC COLLECTION NETWORKS, AND COLLABORATORS



13 TCNS and collaborating institutions: 201 institutions in 50 states

Components of iDigBio

Digitization of Biodiversity Collections

Interactive, Integrative, Innovative – L. Page, PI

- Digitization – G. Riccardi
- Cyberinfrastructure – J. Fortes
- Research – P. Soltis
 - *Access to specimen data: Provide **portal access** to biodiversity data in a cloud-computing environment*
 - *Develop a **computational environment** to facilitate specimen-based integrative biodiversity research*
 - *Develop **research workflows** to anticipate computational needs and linkages*
- Education and Outreach – B. MacFadden

iDigBio Homepage



The screenshot shows the iDigBio homepage with a dark navigation bar at the top. The navigation bar includes the iDigBio logo on the left, and links for 'About iDigBio', 'Research', 'Technical Information', and 'Education' in the center. On the right side of the navigation bar are a 'Google™ Custom Search' box with a 'Search' button and 'Log In | Sign Up' links. Below the navigation bar is a large banner area. On the left, a close-up image of a biological specimen (possibly a sponge) is shown with the text 'Making data and images of millions of biological specimens available on the web'. On the right, a blue box displays statistics: '38,119,987 Specimen Records', '10,807,736 Media Records', and '613 Recordsets', with a green 'Search the Portal' button below. To the right of the statistics is a yellow box featuring a video player with a play button and the text 'Why digitization matters' and 'More about what we do and why'. Below the banner is a row of five light-colored boxes, each with an icon and a title: 'Digitization' (camera icon), 'Sharing Collections' (arrows icon), 'Working Groups' (people icon), 'Proposals' (lightbulb icon), and 'Citizen Scientists' (microscope icon). Each box contains a brief description of the service.

About iDigBio | Research | Technical Information | Education

Google™ Custom Search Search Log In | Sign Up

Making data and images of millions of biological specimens available on the web

38,119,987 Specimen Records
10,807,736 Media Records
613 Recordsets

Search the Portal

Why digitization matters
More about what we do and why

Digitization
Learn, share and develop best practices

Sharing Collections
Documentation on data ingestion

Working Groups
Join in, contribute, be part of the community

Proposals
New tool and workshop ideas

Citizen Scientists
How can you help biological collections?

Researchers

Learn about research directions



Collections Staff

Learn how your collection can benefit from our work



Teachers & Students

Download lesson plans about using digitized specimens



Search Specimen Records

Start Searching

[Help](#) [Reset](#)

Must have image Must have map point

[Filters](#) [Mapping](#) [Sorting](#) [Download](#)

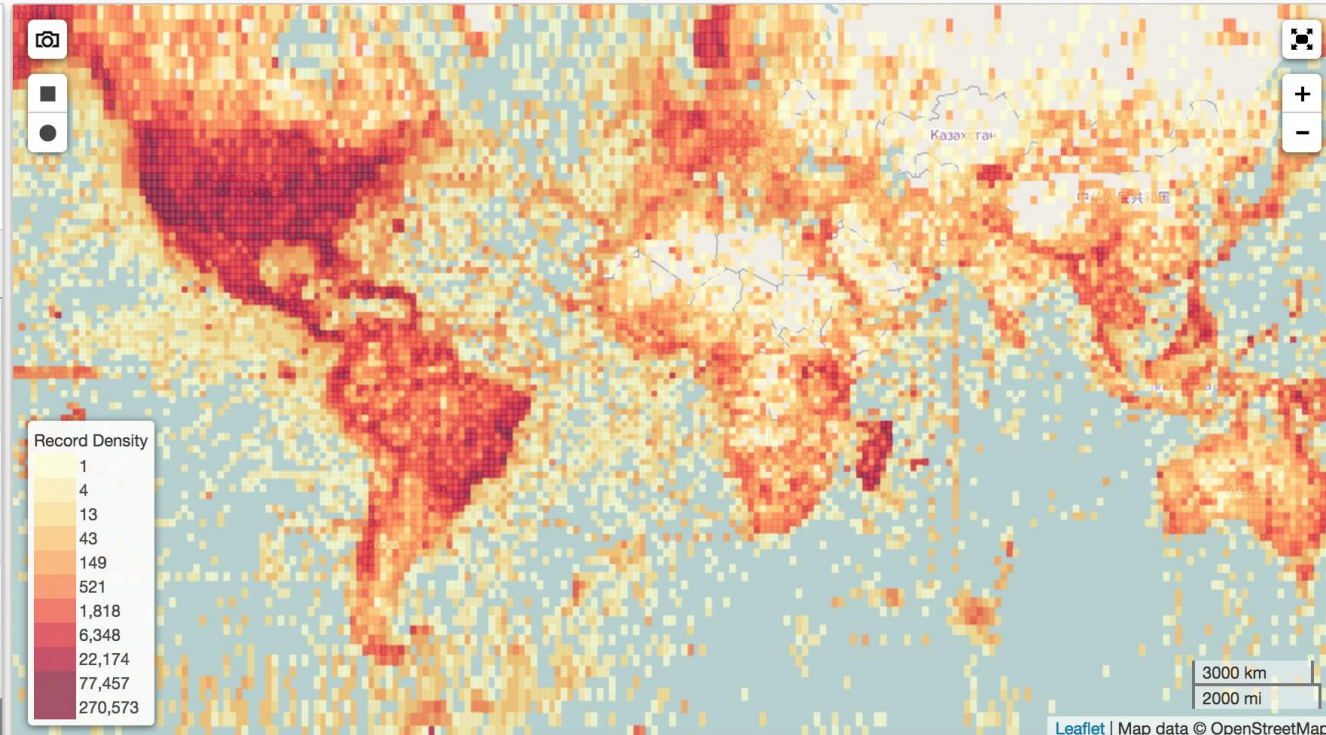
Add a field [Clear](#)

Kingdom Present Missing

Scientific Name [Add EOL Synonyms](#) Present Missing

Date Collected Start: End: Present Missing

[Scroll To Bottom](#)



iDigBio Specimen Portal

Welcome to the iDigBio Portal

If you are familiar with our portal's interface, you can start searching [Specimen Records](#). If this is your first time here, you might consider browsing our [tutorial](#). Our data are based on the [Darwin Core](#) and [Audubon Core](#) standards.

Search 612 Recordsets

Scientific Name

Jump To

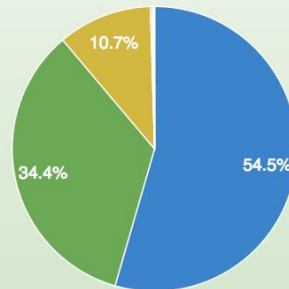
[Advanced Search](#)

[Publishers List](#)

[Tutorial](#)

Specimen Records

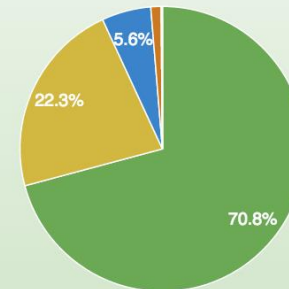
42,534,444



[Animalia](#) [Plantae](#) [Fungi](#) [Chromista](#) [Protozoa](#)
[other](#) ["animalia"](#) [Bacteria](#) [Protista](#)

Media Records

11,794,182



[Plantae](#) [Fungi](#) [Animalia](#) [Chromista](#) [Protozoa](#)
[other](#) [Protozoa](#) [Bacteria](#) [Chlorobionta](#)

Click a pie wedge to jump to an advanced search for records with the given kingdom. Click a legend name to remove/add a pie wedge.

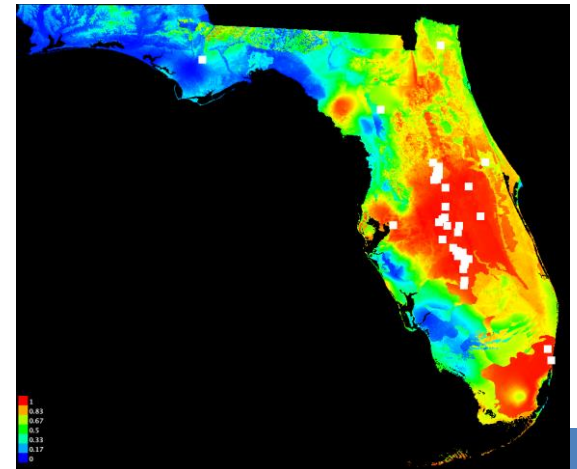


Overview of Day's Activities

- 8:00 Introduction to the workshop & participants – Pam
- 8:20 Introduction to concepts of ENM – Charlotte
- 8:30 Examples of ENM – Charlotte, Blaine, and Clayton
- 9:00 Sources of locality data – iDigBio demo – Pam
- 9:30 Georeferencing concepts – Blaine
- 10:00 Break
- 10:15 Sources of climate data – Lauren
- 10:30 Intro to R and demo of running Maxent – Charlotte
- 12:00 Lunch - PROVIDED
- 1:00 Interpreting Maxent results - Clayton
- 1:30 Projecting results to different times and areas – Blaine
- 2:00 Special topics: making the most of your results – Clayton, Charlotte
- 3:00 Break
- 3:15 Work on data analysis – all
- 4:50 Summary – Pam
- 5:00 End

Summary

- Crash course
- Materials on wiki at iDigBio
- Contact us with questions
- Survey; suggestions?
 - Advanced georeferencing?
 - Advanced ENM?
 - Other topics?
 - Multi-day workshop?
- **THANKS FOR COMING!**



Thank you!



www.idigbio.org

psoltis@flmnh.ufl.edu



facebook.com/iDigBio



twitter.com/iDigBio



vimeo.com/idigbio



idigbio.org/rss-feed.xml



<webcal://www.idigbio.org/events-calendar/export.ics>